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14. ABSTRACT With the U.S. military tasked to conduct multiple concurrent global operations and enemies who eschew traditional warfare, it has become vitally important to protect critical U.S. vulnerabilities and ensure safety of the U.S. center of gravity. Likewise, with the U.S. military shifting towards capabilities-based planning and application of the military aspect of national power with limited resources, an accurate determination of an adversary's critical vulnerabilities will enable friendly forces to select a course of action that best attacks the enemy's center of gravity via indirect means. A methodical deconstruction and analysis of the center of gravity enables a precise identification of the critical vulnerabilities to attack or defend. Although numerous methods have been developed for critical factors analysis, they are individually inadequate to accurately and consistently provide the information vital to operational success. The methodology presented in this paper offers a logical, pragmatic synthesis of established best practices that will better allow operational commanders to apply all aspects of national power to destroy the enemy's center of gravity and also protect the U.S. center of gravity.					
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**Knowing the Center of Gravity is Not Enough:
Critical Factors Analysis in the Operational Environment**

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

23 April 2008

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Abstract

With the U.S. military tasked to conduct multiple concurrent global operations and enemies who eschew traditional warfare, it has become vitally important to protect critical U.S. vulnerabilities and ensure safety of the U.S. center of gravity. Likewise, with the U.S. military shifting towards capabilities-based planning and application of the military aspect of national power with limited resources, an accurate determination of an adversary's critical vulnerabilities will enable friendly forces to select a course of action that best attacks the enemy's center of gravity via indirect means. A methodical deconstruction and analysis of the center of gravity enables a precise identification of the critical vulnerabilities to attack or defend. Although numerous methods have been developed for critical factors analysis, they are individually inadequate to accurately and consistently provide the information vital to operational success. The methodology presented in this paper offers a logical, pragmatic synthesis of established best practices that will better allow operational commanders to apply all aspects of national power to destroy the enemy's center of gravity and also protect the U.S. center of gravity.

Introduction

One must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, on which everything depends...the point at which all our energies should be directed.

-Carl Von Clausewitz, *On War*¹

In 1976, Michael Howard and Peter Paret translated Carl Von Clausewitz's *On War* into English.² Shortly thereafter, the U.S. Naval War College began incorporating Clausewitz's teachings into its curricula. Other U.S. Services followed suit and incorporated Clausewitzian theories of warfare into their Service colleges and, eventually, their Service doctrines.³ Each branch of the armed services, however, adopted a slightly different interpretation of Clausewitz's center of gravity (COG) to suit its style of warfare. For example, the U.S. Marine Corps viewed the COG as a critical vulnerability to facilitate incorporation into maneuver warfare.⁴ The U.S. Air Force, on the other hand, advocated its belief that there were multiple COGs that were "vital centers" and should be simultaneously attacked as strategic targets instead of operational targets.⁵ The U.S. Army stipulated that the COG was a vital component that should be targeted to throw the enemy off balance, which coincided with its Air-Land Battle doctrine.⁶ For almost a decade and a half, numerous monographs, papers, and books attempted to "dispel the myths" of the COG and to coordinate the various Service doctrines into one cohesive Joint doctrine.

In 2006, following the newest revision of Joint Publication (JP) 3-0, *Joint Operations*, and JP 5-0, *Joint Operation Planning*, Joint and Service doctrine now espouse comparable COG definitions.⁷ The corroboration and development of a common COG definition for commanders and planners was a vital development that has enabled the Services to achieve seamless joint activities at the operational level of warfare. The beneficial changes, however, have still left the commanders and planners struggling to determine the actual benefits

realized from identifying the COG and what to do with that knowledge once determined.

Simply determining COGs is not enough to facilitate destruction of the enemy COG and protection of the U.S. COG. U.S. involvement in multiple concurrent global operations and confrontation of an enemy that does not subscribe to traditional warfare have mandated that protection of U.S. critical vulnerabilities (CV) is of paramount importance to ensure the safety of the U.S. COG. Likewise, because the U.S. military is shifting towards capabilities-based planning and application of the military aspect of national power with limited resources, an accurate determination of an adversary's CVs will enable friendly forces to better select a course of action (COA) that attacks the enemy's COG via indirect means. A methodical deconstruction and analysis of the COG will enable the military to identify the CVs that must be defended or attacked. Although much of the debate regarding the center of gravity has revolved around Clausewitz's true intent and a smorgasbord of JP and individual Service definitions, a thorough deconstruction of the center of gravity through critical factors analysis could provide operational commanders and planners with more relevant information that will lead to success on today's battlefield.

Background

Although the debate about a proper COG definition was resolved following the publication of the most recent JPs, commanders and planners were still left with questions regarding the usefulness of the COG construct. JP 3-0 defines the COG as "the set of characteristics, capabilities, and sources of power from which a system derives its moral or physical strength, freedom of action, or will to act."⁸ In *On War*, Clausewitz stated that:

The first principle is that the ultimate source of substance of enemy strength must be traced back to the fewest possible sources, and ideally to one alone. The attack on these sources must be compressed into the fewest possible actions – again, ideally, into one.⁹

A thorough examination of the JP 3-0 definition of the COG and Clausewitz's statement above suggests that once the COG has been identified, one should simply apply the appropriate military force to destroy the COG and ensure victory. In modern times, however, due to dispersed forces, long range kinetic weapons, and modern communication technologies, combatants typically do not have the ability to act directly against a COG in one singularly decisive engagement. In fact, renowned warfare theorist B.H. Liddell Hart states, "To apply one's strength where the opponent is strong weakens oneself disproportionately to the effect attained. To strike with strong effect one must strike weakness."¹⁰

When direct attack is not possible, JP 3-0 states that combatants should target CVs of the COG until the cumulative effects result in accomplishment of the objective.¹¹ An accurate determination of the CVs, however, requires leaders to undertake a critical factors analysis (CFA) of the COG. Unfortunately for commanders and planners, the concept of CFA has not received as much attention as COG determination. Multiple authors have attempted to determine the best method for CFA, but this has created much confusion.

Common Definitions

Like previous "discussions" concerning what constitutes a COG, the first battle waged in CFA usually revolves around definition of terms. In most literature, CFA advocates have adopted Dr. Joe Strange's definitions associated with COG deconstruction, namely critical capabilities (CC), critical requirements (CR), and CVs.¹² As a result, and since the publication of Dr. Strange's monograph in 1996, the JPs have adopted very similar definitions. To ensure a joint understanding of the terms, this author will employ the definitions of critical factors presented in JP 3-0, which have been incorporated into the latest revision of JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*. The definitions are as follows:¹³

Critical Capability: A means that is considered a crucial enabler for a center of gravity to function as such and is essential to the accomplishment of the specified or assumed objectives.

Critical Requirement: An essential condition, resource or means for a critical capability to be fully operational.

Critical Vulnerability: An aspect of a critical requirement which is deficient or vulnerable to direct or indirect attack that will create decisive or significant effects.

Joint Doctrine Critical Factors Analysis

In JP 5-0, the Joint Chiefs of Staff (JCS) provide a method for CFA. This method relies heavily on a system of systems analysis (SOSA), which involves identifying the COG and breaking it down into a system of interrelated critical factors. This method determines a number of nodes and links that, when combined, provide the interrelationship between COG systems and capabilities. Nodes are defined as the people, facilities, individual systems, forces, information, and other physical components of the system. Links are defined as the behavioral, physical, or functional relationships among nodes.¹⁴ The nodes and links of the SOSA construct usually reside in six specific realms: Political, Economic, Military, Information, Social, and Infrastructure. Although the JP 5-0 is careful to recognize that the COG is rarely a single node or link, but more likely a set of nodes and their respective links, this does not provide planners with useful information to develop an operational COA.

The greatest failure of the SOSA for COG deconstruction is its inability to provide useful information to commanders and planners. Most modern-day COGs are comprised of numerous systems with many nodes and links. A SOSA approach is therefore too simplified for the operational level of war where the realities of friction and the fog of war can wreak havoc on plans and simplistic thinking. In his dissection of the SOSA for COG deconstruction, Dr. Milan Vego emphasizes that “all systems approaches [are] inherently

‘reductionist’—that is, [they] seek to reduce the situation to a number...of simple elements.”¹⁵ A simplistic or “reductionist” approach to COG deconstruction is a recipe for disaster in the complex environment of operational planning.

Ends, Ways, and Means Methodology

In comparison to the SOSA method prescribed by the JP 5-0, Colonel Dale Eikmeier, of the U.S. Army War College, proposes a more “logical method” for COG analysis. In this method, he describes the problem as a simple application of Arthur Lykke Jr.’s strategic framework. Lykke’s framework, which was later adopted by the JP 5-0 to describe the operational art elements to be considered by the operational commander, is that, “strategy is a coherent expression of ends, ways and means designed to achieve a certain goal.”¹⁶

Prior to the application of the “Ends, Ways, Means” methodology, Col. Eikmeier defines CC, CR, and CV utilizing Dr. Strange’s 1996 definitions. Following these definitions, however, Col. Eikmeier further discusses the attributes of each critical factor. For example, like Dr. Strange, he associates the critical factors with parts of speech.¹⁷ Because COGs are physical, tangible things that can be destroyed, they are nouns. Likewise, the CCs are actions or activities that enable the COG to be the source of power; therefore, they are verb or verb-like (an ability to do something). The CRs are the conditions and resources that allow the COG to execute a CC, and therefore can be either a noun or a verb. Similarly, because a CV is a component of a CR, a CV can be either a noun or a verb. This author adopts this framework in his CFA development.

After reiterating Dr. Strange’s helpful association with word class, Col. Eikmeier develops his “Ends, Ways, Means” methodology. He outlines four steps:¹⁸ 1) Determine the desired endstate, 2) Determine the ways (CCs) to realize the endstate, and choose the option that is most likely to achieve the ends, 3) List the means or conditions (CRs) required to

enable the previously selected ways, and 4) Select the entity (noun) from the list of means or conditions that can achieve the endstate. This final entity should be the COG. Col. Eikmeier then utilizes the “Does/Uses” validity test to determine if the COG selection was correct or if a CR was accidentally selected. In his argument, the COG is the “doer;” it performs work and is ultimately the source of power for the combatant. Likewise, if an object is “used” in the execution of the action, then it is more likely a CR for the COG.¹⁹

Although the parts of speech and “Does/Uses” test that Col. Eikmeier incorporates are helpful in a thorough CFA, there are flaws. Even though the COG is directly related to the ends or objectives, it is counterintuitive to determine capabilities without first identifying the COG. As defined above, CCs are the primary abilities that merit a COG being identified as such. It is therefore vital to determine the COG prior to determining the CCs. If one performs the “Ends, Ways, Means” methodology exclusively, it is possible that vital CCs will be overlooked once a COG has been determined. These overlooked capabilities may contain CRs vulnerable to attack. Although portions of Col. Eikmeier’s approach are helpful in the deconstruction of a COG, wholesale application of the “Ends, Ways, Means” process is likely to inhibit a thorough CFA of the COG.

Dr. Milan Vego Methodology

In his book, *Joint Operational Warfare*, Dr. Milan Vego espouses another method to perform CFA. Unlike the JP definition of critical factors, Dr. Vego defines critical factors as those critical strengths (CS) and critical weaknesses (CW), tangible or intangible, that are considered essential for the accomplishment of the operational objective. After the operational objective has been determined, protagonist and adversary strengths and weaknesses are identified. From the list of CSs, the COG is determined by selecting the CS that is solely capable of accomplishing the objective. Once the COG has been determined,

the CSs and CWs are evaluated to determine any CVs.

This method of COG analysis is very likely to determine the correct operational and strategic COGs; however, the associated CFA does not adequately address the CCs, CRs, and CVs. One explanation for this inadequacy is that Dr. Vego has adopted Clausewitz's emphasis on the importance of concentrating the main effort on destroying the enemy's COG, instead of considering an indirect attack on CVs. Dr. Vego states, "...to accomplish the assigned military objective, one must focus the major part (though not necessarily all) of one's efforts against the strongest sources of the enemy's power – his center of gravity."²⁰ Combat in the modern world, however, is more likely to require a systematic approach to the destruction of an enemy's COG through exploitation or destruction of CVs.

Another danger in the CS and CW analysis is the possibility of attack on a CW simply because it has been deemed "critical" and is further denoted as a "weakness." Navy Warfare Publication (NWP) 5-01, *Navy Planning*, emphasizes, "Striking a weakness that [is not critical] is simply a measure taken to harvest 'low hanging fruit' that offers no decisive benefit."²¹ To apply Dr. Vego's methodology, it is therefore vital to utilize the critical factors to determine the COG, but then determine the CVs open to attack using a different methodology.

In addition to a useful way to determine the COG, and in contrast to the SOSA, utilization of Dr. Vego's tangible and intangible lists takes into consideration the human element of the warring sides. A thorough analysis of the CSs and CWs includes evaluation of the will of the people, training level of the enemy forces, and troop morale. Lastly, because the COG is directly tied to the objective, there can be multiple COGs. For example, each level of war will have at least one COG, and within a level of war there may be multiple

COGs if there are multiple objectives across time.²² Although wholesale application of Dr. Vego's method will lead to an incomplete CFA, this author will adopt several useful techniques that will be developed in the discussion and analysis section.

Navy Planning Process

In the latest revision of NWP 5-01, the Navy sets forth the most complete approach to a thorough COG deconstruction available in official publications. Unfortunately, however, the current revision does not adequately instruct planners and commanders to analyze the COG methodically in a manner that will facilitate success on the battle field. The NWP 5-01 process utilizes Dr. Vego's approach of using the military objective to determine CSs and CWs, which ultimately leads to identification of the COG. In the COG determination, however, NWP 5-01 describes the COG as both a strength and critical capability.²³ By definition, however, a critical capability is what enables a COG to be a COG. Therefore, the capability cannot be a COG in and of itself. Incorporation of the parts of speech assessment would alleviate this confusion.

The next step of NWP 5-01 COG deconstruction involves determining the CCs. This publication not only advocates using the CSs and CWs identified in COG determination as possible CCs, but also recommends using Universal Joint Task List (UJTL) operational functions of command and control, intelligence, sustainment, protection, fires, and movement and maneuver.²⁴ This framework provides a starting point from which a planner can begin to accurately determine the capabilities that enable a COG to become the source of power. This author will expand upon this framework to ensure that planning staffs are thoroughly capable of performing a CFA of a COG when time is short or experience is limited.

Dr. Joe Strange and the Army Planning Primer

Dr. Joe Strange from the Marine Corps University was one of the first individuals to

develop and utilize CFA of a COG. In his monograph, entitled *Centers of Gravity & Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language*, Dr. Strange first introduced the concepts of CCs and CRs. His monograph was an attempt to clarify the concept of COG and incorporate a universal definition into Joint and Service doctrine. In his writings, Dr. Strange developed and explained the relationships among the COG, its enabling CCs, the requirements necessary to carry out those capabilities (CRs), and the requirements vulnerable to attack (CVs).

In the development of these concepts, Dr. Strange developed the parts of speech model utilized by Col. Eikmeier. In addition, he utilized a functional approach to determine the CCs that was organized and methodical. In his method, he utilized functions such as: Move/Reach, See/Find, Surprise, Kill, and Survive.²⁵ Unfortunately, the functions Dr. Strange utilized did not incorporate all Services or Joint doctrine. Although there is no apparent correlation between the NWP 5-01 approach to utilizing the UJTL operational functions and Dr. Strange utilizing functions to determine the CCs, this author will adopt the methodology in order to vector a planning staff to a thorough COG deconstruction.

Similarly, Dr. Jack Kem of the U.S. Army Command and General Staff College in *Campaign Planning: Tools of the Trade* adopts Dr. Strange's methodology with two minor changes. First, Dr. Kem adds an additional step after determination of the CRs. In this step, he develops a list of CWs to facilitate determination of the CVs.²⁶ Although possibly helpful in finding CVs, if one adopts a holistic view of the process when determining the initial list of CWs for COG determination, the separate listing of the CWs would prove redundant. The second minor change is beneficial to a thorough COG deconstruction. In this step, Dr. Kem advocated performing a "crosswalk" check to ensure that CVs are linked to CRs, which in

turn tie directly to CCs and the COG.²⁷ Performing a “cross walk” check and tying the CVs to the CCs and the COG ensures that if a particular indirect attack is not working or if the COG has shifted, effort will not be wasted on CVs that are not accomplishing the objective.

Discussion and Analysis

Each of the above-described methods of COG deconstruction has some merit. Unfortunately, however, to provide the commander and planning staff the necessary and accurate information at the operational level of war, a different methodology is required. For example, Dr. Vego’s COG determination is logical and straightforward, but his determination of CVs is incomplete. Likewise, Col. Eikmeier’s “Ends, Ways, Means” methodology is helpful for testing COG validity, but is not logically ordered for determination of CCs, CRs, and CVs. In this author’s view, a synthesis of the positive aspects of each approach allows a more complete deconstruction of the COG that will provide a more thorough conceptual understanding to a larger audience. Most importantly, operational planners could benefit, who, because of the situation, may lack the experience or adequate time to fully explore the art of operational planning.

The COG determination, although extremely important, can be achieved by several methods. In *Center of Gravity: Determination, Analysis, and Application*, Giles and Galvin offer a method that systematically chooses and tests a COG for both the strategic and operational levels of war.²⁸ To create a methodology that is user-friendly and thorough, however, this author will adopt Dr. Vego’s method of listing the CSs and CWs for both the enemy and the friendly sides that are necessary to accomplish the stated military operational objective. One method to help organize the CSs and CWs is to utilize the operational factors of time, space, and force to derive the lists. From the CSs, the strength that is absolutely

critical in the accomplishment of the objective is determined to be the COG. As theorized by Clausewitz and reiterated in the JP 5-0, at the operational level of war, the COG is likely be an enemy combatant force or a component thereof.²⁹ A key incorporation of Dr. Strange's methodology and a check on the validity of the COG is that the COG should be a noun -- something that can be the source of all power. Once the COG has been determined, the COG deconstruction through CFA begins.

The first step in the deconstruction is to determine the CCs that enable the COG to accomplish the military objective. As initially proposed by Dr. Strange and further refined by NWP 5-01, operational functions (as defined by the UJTL) are a logical organizational tool to focus the efforts for determining the CCs. This would allow the COG to be broken down into the six functions (intelligence, fires, protection, sustainment, movement and maneuver, and command and control). At this point, one could simply determine the CCs that enable the COG. Another step, however, is helpful in refining the capabilities that are truly critical, thus ensuring a more complete deconstruction.

A further division of the operational functions into operational warfighting "areas" enables a more logical and repeatable approach to CCs. There are two possible methods to derive operational warfighting areas. First, in the Joint environment where the operational COG is perhaps a composite of more than one Service or in a non-traditional environment (i.e. humanitarian assistance/disaster relief), the areas could be the next levels in the UJTL (i.e. the two digit sub-tasks). This would ensure that the capabilities derived would be verbs or action words. Second, in the situation where the COG is a single Service, the warfighting areas could be Service-specific. An example of this could be the U.S. Navy's Composite Warfare Commander concept or the elements of a Marine Air Ground Task Force.

Once a CC has been determined, the next step is a determination of the resources required to allow the COG to utilize this capability. These resources, essential conditions, or means are the CRs. It is important to note that conditions required for this capability could be anything from required weather parameters to the sequencing of events between units in an operation. In this arena, different from the SOSA method described in JP 5-0, human interaction and limitations should be addressed. One important aspect of CRs is that although this analysis is performed at the operational level of warfare, the requirements are sometimes associated with the tactical level of warfare. All CRs should be listed, regardless of the level of war. This will ensure that any CV offering an indirect path to the COG has been evaluated and addressed if possible.

The last step in a CFA of the operational COG is to determine the CVs from the CRs. In CV determination, operational commanders and planners must thoroughly examine the CR list from a holistic point of view to harness all instruments of national power. For example, a particular CR of a COG might be alliances and associated military support. The diplomatic, informational, or economic instruments of national power might enable indirect attack of this CR, whereas a military option would be infeasible. If one looks only through the military lens at a problem, true CVs might be overlooked for the more obvious military solutions. The key in CV determination is the impact on the COG.

Once the CFA has been completed, it is vital to adopt the “cross walk” check described by Dr. Kem to ensure adequate linkage of CVs to COG. This final step ensures that CFA is not a stagnant process that culminates at the development of a COA. An accurate linkage, continually updated, allows the planner and commander to assess the situation continuously and adapt as necessary to changing circumstances.

Application

In developing this methodology for a thorough CFA, this author applied it to numerous case studies to demonstrate its efficacy in the operational environment. To provide a modern example comprehensible to all Services, Operation IRAQI FREEDOM (OIF) (post major combat operations) was selected. Similarly, in an effort to demonstrate the applicability of this methodology to a non-traditional operation that incorporates multiple U.S. Government agencies, multinational partners, and non-traditional partners in recent history, Operation UNIFIED ASSISTANCE (OUA) was analyzed. Due to the complexity of these operations and this paper's size limitations, the following analyses are subsets of a complete analysis. The OIF analysis is presented below. The OUA analysis is located in the appendix with a summary of findings below. In addition, for this paper to remain unclassified, the OIF analysis is unclassified.

Operation IRAQI FREEDOM

OIF affords a great example of enemy COG deconstruction that identifies CVs that focus Multinational Force Iraq's (MNF-I) efforts to defeat the insurgency. The insurgent operations in Iraq demonstrate a situation where once the COG is determined, it becomes apparent that it is not vulnerable to direct attack. As described above, the first step in the process is the determination of the operational military objective for the insurgent forces in Iraq. Although there are multiple possible subordinate objectives, it is important to determine the overall operational military objective. In most cases, this objective is derived from the strategic vision and direction for the operation. For example, if the overarching enemy strategic vision in the Middle East is to reduce Western influence in the region, then in the case of the insurgent forces in Iraq, the primary operational objective is to disrupt the coalition efforts to stabilize Iraq. After determining the objective, the CSs and CWs are

listed. In this step it is vital not only to list the tangible items, but also the intangible items such as comprehensive knowledge of the area and insurgent morale. Figure 1 illustrates the operational military objective and the CS and CW lists. From the list presented below, the only CS capable of achieving the operational objective is the large network of insurgent groups. The selection of the insurgent groups, although not a traditional military force, follows the theory that the operational COG usually comprises military forces or components thereof.

The next step in the COG deconstruction is determination of the critical factors. In this step, the utilization of the UJTL, as shown in figure 2, is the organizational method described in the discussion and analysis section. As mentioned, the example in figure 2 does not include every operational function or “broad functional task area” in the UJTL. Instead, this representative example illustrates the use of the UJTL to focus the planner. From the operational function, several sub-tasks further refine the function into operational areas, as shown in figure 2. From these operational warfighting areas or sub-tasks, one can determine the CCs that enable the COG to function as such.

The last two steps of the COG deconstruction are the most vital and will require the commander and planners to employ the art of operational warfare. In these steps, once the CCs are determined, the CRs are derived. As mentioned above, in the OIF case study, the CRs may reside at the tactical level. In Iraq, the consumables required to construct improvised explosive devices (IED), and the routes to and from the target areas are tactical requirements that “enable” a CC, which in turn empowers the large network of insurgent groups as the operational COG in Iraq. Continuing the example above, figure 3 illustrates the

Operation IRAQI FREEDOM (Post Major Combat Operations) Insurgent Operational Center of Gravity Deconstruction

Operational Objective: Disrupt coalition attempts to secure Iraq through terrorist actions against non-cooperative civilians and coalition forces

Critical Strengths:

- Insurgent ability to blend with local non-combatants (force, space, time)
- Network of like-minded insurgent groups (al Qaeda in Iraq, JAMI) (force)
- Extensive knowledge of geography and overall environment (space)
- Outside support from other radical groups or anti-US groups (space, force)
- Effective use of media outlets for message dissemination (force)

Critical Weaknesses:

- Cannot confront coalition military conventionally (force)
- Selected course of action relies on killing civilians, which undermines international opinion (force, space)
- Limited physical infrastructure to ensure constant supply of bomb making materials and weapons (space, time)

Operational Center of Gravity: Large network of like-minded insurgent groups

Figure 1

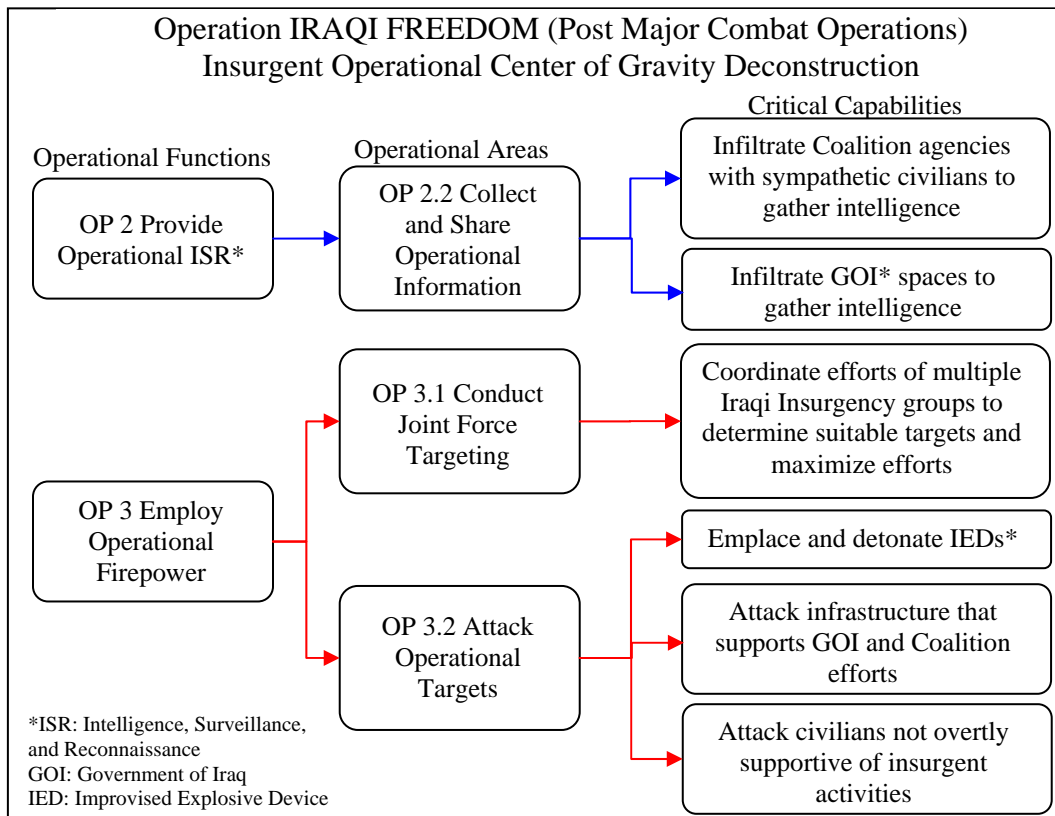


Figure 2

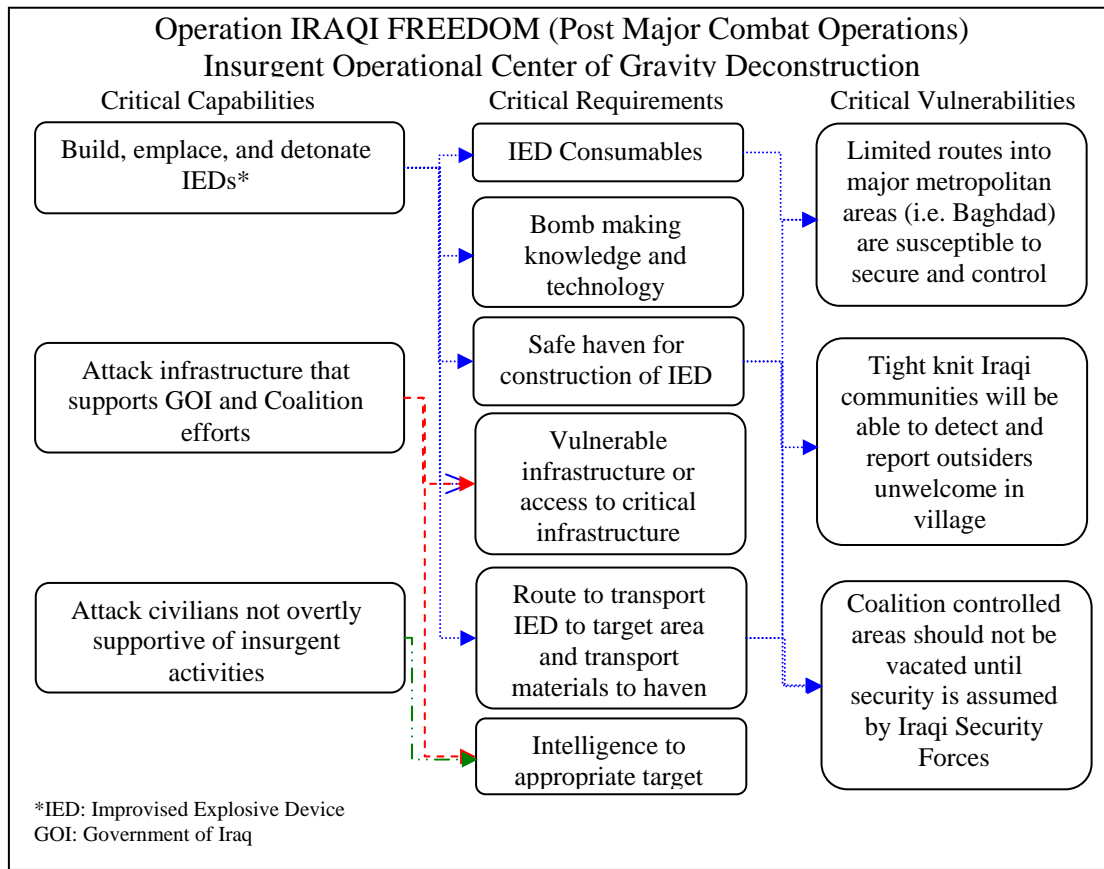


Figure 3

relationship among the CCs identified in figure 2, and the resources or conditions that are required perform each capability.

The last step utilizes all aspects of national power to determine which CR is vulnerable to attack. In the OIF example, illustrated in figure 3, the CVs have all four elements of national power utilized in their exploitation. The obvious, primarily military application is to secure the routes into and out of major metropolitan areas. Even this application has informational aspects with regard to informing the public that coalition forces intend to achieve the safety of the Iraqi people. Likewise, utilization of the Iraqi people to secure their neighborhoods employs the diplomatic, informational, and possibly the economic aspect if monetary rewards are incorporated. Once identified, these CVs allow MNF-I to concentrate its efforts on indirect attack of the enemy COG, which ultimately will

result in its elimination.

Lastly, after the CFA reveals the CVs, the “cross walk” or linkages should be illustrated. In the OIF example, shown in figures 2 and 3, the arrows illustrate connecting the COG to the CCs and the resulting CRs and CVs. This linkage allows the commander and planner to assess the results of the operation continuously, and reveals other COAs that might yield more preferred results if the current COA is not working.

Interestingly, this example has been applied in real-world operations with tremendous success. Under the leadership of Generals David Petraeus and Raymond Odierno, the MNF-I and MNC-I were able to strangle the supply and delivery routes into and out of Baghdad. In addition, they were able to biometrically track and account for pro-coalition individuals, and utilize the Iraqi people (“Sons of Iraq”) to self-police the large villages and neighborhoods. Lastly, the areas initially secured by coalition forces were defended until arrival of Iraqi Security Forces.³⁰ The sum effect of these indirect attacks on the insurgent COG was a 60 percent drop in violence and coming closer to overall destruction of the enemy COG.³¹

Operation UNIFIED ASSISTANCE

OUA provided a unique example of COG deconstruction for two reasons. First, this deconstruction was of a friendly COG that must be protected. In the case of OUA, no threat to the physical destruction of the COG existed, but rather an incapacitation of the COG that would prohibit it from accomplishing the stated operational objectives. Second, OUA was not a traditional military event. This case, however, showed that the planners and commanders must ensure U.S. COG protection so that objectives would be accomplished. The operational objective and CSs led to a COG of the U.S. Armed Forces operating in support of (ISO) tsunami relief efforts. The deconstruction illustrated in Appendix A shows

that CVs related to this COG and objective were very heavily tied to the interaction and coordination with the host nation and other organizations, including other U.S. government agencies (OGA), non-governmental organizations (NGO), international governmental organizations (IGO), private volunteer organizations (PVO), and a multi-national (MN) coalition.

The OUA CVs were addressed by the formation of a combined support force (CSF) instead of a more traditional combined task force (CTF). This construct and the creation of CSF-536 allowed the OGAs, NGOs, and MN coalition partners to understand the role of the U.S. Armed Forces in the operation. Had this CV not been “protected” or addressed in the operational planning stage, the effectiveness of both U.S. military and international efforts would have been severely hampered. A thorough CFA of OUA allowed planners and commanders to adopt a new construct that allowed the operational objective to be achieved through innovative application of military capabilities.

Conclusion and Recommendation

A thorough COG deconstruction is pivotal to the employment of operational art in the operational planning and decision-making process. The environment that defines today’s battlefield does not lend itself to a simple concentration of mass and army versus army collisions. Technology, tactics, and political ramifications contribute to the dispersion of the battlefield and complex COGs that are often difficult to identify. A COG may shift several times as the battle rages. A methodical, systematic COG deconstruction, however, can reveal when a COG has changed. As recent OIF events demonstrate, a COG may shift prior to its destruction. If an entity is no longer the hub of all power, then it is no longer the COG, and the selected COA (and its CONOPS) must be reevaluated to ensure proper application of all

aspects of national power.

After a 15-year “dialogue,” consensus on the definition of COG has been reached. Accordingly, this paper recommends that emphasis now must shift to proper application of COG knowledge once determined. The methodology presented in this paper is not entirely unique, but it represents a pragmatic integration of the best CFA practices over the past several decades. This methodology offers commanders and planners a logical COG deconstruction that may be employed to determine where, when, and how best to apply diplomatic, informational, military, and economic resources to accomplish the operational objective.

Notes

1. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 595-596.
2. Lloyd J. Matthews, "On Clausewitz," *Army* 38, no. 2 (February 1988): 24.
3. Harry G. Summers Jr., *On Strategy II: A Critical Analysis of the Gulf War* (New York: Dell Publishing, 1992), 82.
4. FMFM 1 Warfighting (Washington, DC: Dept of the Navy, HQUSMC, 6 March 1989) . 35-36.
5. John B. Saxman, *The Concept of Center of Gravity: Does it Have Utility in Joint Doctrine and Planning?*, (Fort Leavenworth, KS: School of Advanced Military Studies, United States Army Command and Staff College, 28 May 1992) 15-19.
6. U.S. Army, *Operations*, Field Manual (FM) 100-5 (Washington, D.C.: Headquarters Department of the Army, May 1986), 179-180, Appendix B "Key Concepts of Operational Design.
7. The Navy's doctrinal publication, Naval Doctrinal Publication 1, has not been revised since 1994 and does not reflect the "joint" definition of center of gravity. Navy Planning, Navy Warfare Publication (NWP) 5-01, however, adopts the joint definition described in JP 3-0. Chief of Naval Operations, *Navy Planning*, Navy Warfare Publication (NWP) 5-01, (Washington, DC: Department of the Navy, CNO, January 2007) C-3; and Chief of Naval Operations, *Naval Warfare*, Naval Doctrinal Publication 1, (Washington, DC: Department of the Navy, CNO, 28 March 1994) 35.
8. Chairman, U.S. Joint Chiefs of Staff, *Joint Operations*, Joint Publication (JP) 3-0, (Washington DC: CJCS 17 September 2006), GL-8.
9. Clausewitz, *On War*, 617
10. B.H. Liddell Hart, *Strategy*, 2nd ed. (New York, NY: Henry Holt and Company, 1991), 212.
11. Chairman, U.S. Joint Chiefs of Staff, *Joint Operations*, Joint Publication (JP) 3-0,
12. Joe Strange, *Centers of Gravity and Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language*, Perspectives on Warfighting Series no. 4 (Quantico, VA: Marines Corps Association, 1996) 43.
13. Chairman, U.S. Joint Chiefs of Staff, *Joint Operations*, Joint Publication (JP) 3-0, GL8, GL13.
14. Chairman, U.S. Joint Chiefs of Staff, *Joint Operation Planning*, Joint Publication (JP) 5-0, (Washington DC: CJCS 26 December 2006), III-8.
15. Milan Vego, "Systems Approach to Center of Gravity," *Campaigning*, (Fall 2006): 19. http://www.jfsc.ndu.edu/schools_programs/jaws/publications.asp (accessed 15 March 2008), 36.
16. Dale C. Eikmeier, "A Logical Method for Center of Gravity Analysis," *Military Review*, 87, no. 5 (September/October 2007): 63.
17. Strange, *Centers of Gravity*, viii.
18. Eikmeier, "A Logical Method for Center of Gravity Analysis," 64.
19. Col. Eikmeier uses the example of transporting goods by rail. The system is derived of tracks, fuel, cars, operators and the locomotive. Col. Eikmier illustrates the use of the does/uses validity test as follows: The tracks do not do anything, they are used by the

locomotive for support. The fuel is not capable of doing anything by itself and it is used by the locomotive. Likewise, the cars can carry freight, but they do nothing without another actor. The operators are vital components, but again, they are not capable of doing the transporting without the locomotive. In the end, the locomotive is the only item that is capable of doing what is required to move the goods by rail. The locomotive is the center of gravity, with the remainder of the components being critical requirements. Dale C. Eikmeier "Center of Gravity Analysis," *Military Review*, 84, no. 4 (July-August 2004): 3.

20. Milan Vego, *Joint Operational Warfare*, (Newport, RI: U.S. Naval War College, 20 September 2007) VII-26.

21. Chief of Naval Operations, *Navy Planning*, C-4.

22. Dr. Vego utilizes an example of the different functional commanders (land component, air component and maritime component) in Operation DESERT STORM each having a different COG due to the different functional objectives which it turn contribute to the overall military operational objectives for the conflict. Milan Vego, "On Center of Gravity," *Campaigning*, (Spring 2006): 35-36.

http://www.jfsc.ndu.edu/schools_programs/jaws/publications.asp (accessed 15 March 2008).

23. Chief of Naval Operations, *Navy Planning*, NWP 5-01, C-3.

24. Ibid.

25. Strange, *Centers of Gravity*, 58-59.

26. Jack Kem, *Campaign Planning: Tools of the Trade*, 2nd ed. (Fort Leavenworth, KS: United States Army Command and General Staff College, June 2006), 45-57.

27. Kem, *Campaign Planning*, 51.

28. Phillip K. Giles and Thomas P. Galvin, *Center of Gravity: Determination, Analysis, and Application*, (Carlisle Barracks, PA: Center for Strategic Leadership, United States Army War College, 31 January 1996), 5-15.

29. Chairman, U.S. Joint Chiefs of Staff, *Joint Operation Planning*, JP 5-0, IV-8

30. Frederick W. Kagan and Kimberly Kagan, "The Patton of Counterinsurgency," *The Weekly Standard* 13, no. 25 (March 10, 2008): 32.

31. Ibid, 27.

Appendix

The investigation of a non-traditional operation provides numerous insights into the applicability of COG deconstruction. Operation UNIFIED ASSISTANCE was the U.S. military's contribution to the 2004 Southeast Asia tsunami. Although OUA was not a traditional operation, the methodology described in this paper's discussion is applicable to a friendly COG deconstruction. In a humanitarian assistance/disaster relief (HA/DR) operation similar to OAU, a traditional enemy does not exist. A thorough friendly COG deconstruction, however, was still helpful. Although the U.S. COG was not in danger of direct attack from enemy forces, an unintentional indirect "attack" might have impeded accomplishing the operational objective. In this case, as in many non-traditional operations, the "indirect attack" likely could have been poor public affairs portrayal (and resulting misperception) of the U.S. military role.

Figure A-1 shows the operational objective of the U.S. Armed Forces in the region. From the objective, numerous CSs and CWs can be derived. Once again, a useful tool in CS and CW derivation is to utilize the operational factors and ensure inclusion of the intangible aspects that may contribute to a strength or weakness. In the OAU case, the intangible aspect of great concern was that many non-governmental agencies had not worked directly with the U.S. military in the past, and perceptions of the U.S. military mission were skewed. From the list of CSs and CWs, it became obvious that the only entity capable of achieving the operational objective was an all-U.S. Service command operating in the region in support of the tsunami relief efforts.

Operation UNIFIED ASSISTANCE
Friendly Operational Center of Gravity Deconstruction

Operational Objective: Mitigate effects of tsunami by slowing loss of life, maintaining relative regional stability and provide command, control and coordination as required for HN, MN, OGA, IGO, and PVO entities operating in the region

Critical Strengths:

- U.S. Armed Forces in region
- Other U.S. Government agencies operating in support of operations
- Outpouring of public support in favor of relief operations
- Large logistical support capabilities resident in Carrier and Expeditionary Strike Groups
- Large Multi-national response to tsunami

Critical Weaknesses:

- U.S. military operations with other U.S. Government agencies not standardized or frequent
- Geographically dispersed areas in need of assistance
- Reliant on host nation approval of assistance from outside governments
- Non-governmental agencies not accustomed to operations with U.S. military

Operational Center of Gravity: U.S. Armed Forces operating in support of Tsunami Relief operations (Friendly military force)

Figure A- 1

The next step, as shown in figure A-2, lists several of the operational functions and associated “warfighting” areas. As expected, the functions most applicable to OAU were command and control, force protection, and logistics in the operational context. The capabilities derived from the UJTL operational functions reveal that even in a non-traditional environment, COG deconstruction can be very useful to mission accomplishment.

The next steps in the process again revolve around dissecting the CCs into the component resources they require to function. Figure A-3 shows the linkage among the CCs, CRs, and resources that are vulnerable to attack (CVs). In a friendly COG deconstruction, it is equally important to examine the CCs, CRs, and CVs from all aspects of national power. In this case, the CV most needing of protection resided in the informational realm. For mission success and objective accomplishment, the NGOs, IGOs, and MN coalition partners

needed to know that the U.S. military, in a supporting role, was present to provide logistical and coordination support among the various agencies and organizations contributing to HA/DR efforts.

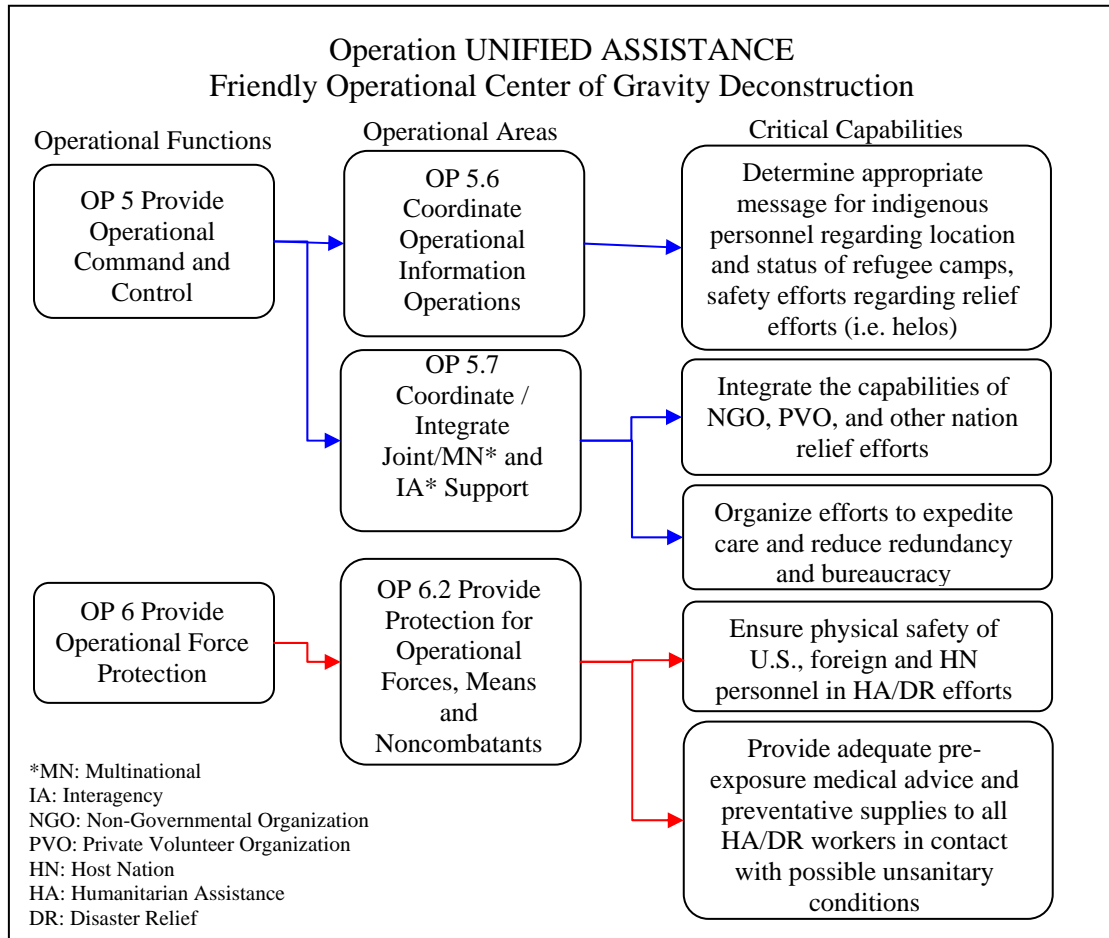


Figure A- 2

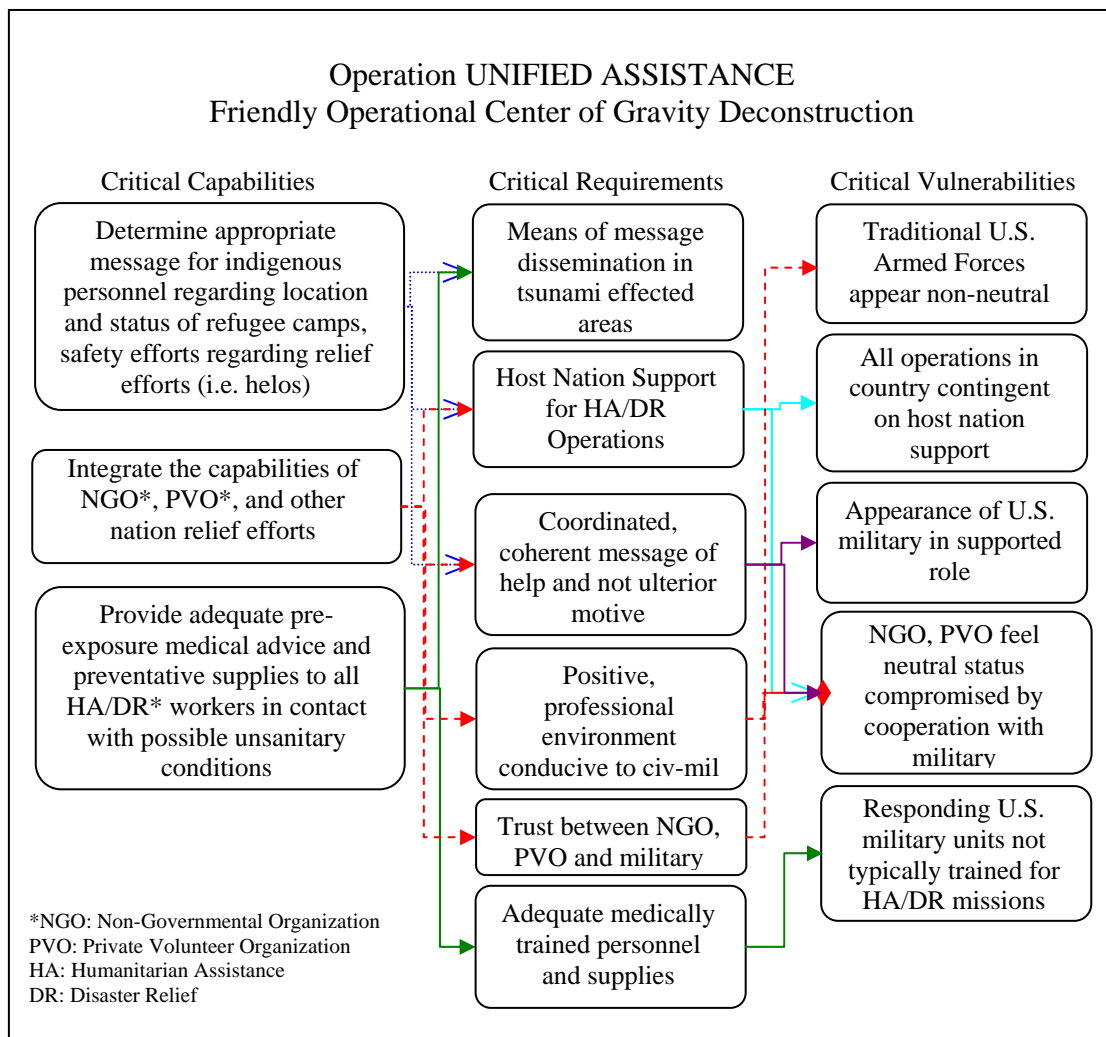


Figure A- 3

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